

Seventh Quarterly Report
Contract: NSR-39-005-018
Project: 15G-B2299
Period: 1 July - 30 September 1966

TASK I

A small colony of planaria is being maintained.

Members of the colony have each been tested several times over simple grids.

A "starting ring" has been designed which appears to be satisfactory. This ring constrains the animal to initiate its grid traverse from some initial fixed angle on the grid.

Illumination measurements indicate the absolute uniformity is very difficult to achieve within the magnetic shield configurations we have available.

As many as five to fifteen "runs" have been accomplished with one worm. Runs with all 26 worms of the colony have been made. In the latter case, "clean" dishes have been used for each run to eliminate the possibility of each successive worm following the slime trail left by the preceeding worm.

As a starting point in our data analysis, we are summing vector components of the worm trails. This is both tedious and time-consuming work, but is considered the best method at the moment. The Rayleigh Test, for non-uniform distribution (i.e. whether the data are significantly different from uniform) appears to be the best to apply. Modifications of this test, developed by Durand and Greenwood, are being studied.

We have been fortunate to acquire the cooperation and active participation of Dr. Irwin R. Isquith (Protozoologist, The Academy of Natural Sciences) in the work.

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PLANS FOR THE NEXT PERIOD

1. Enlarge and stabilize our planaria colony.
2. Pursue further study of the experiment design.
3. Continue study of statistical techniques to be used in the data analysis.
4. Improve present shield and coil setup for the experiment.

TASK II

All temperature modulators have been designed. We are pleased to report that over a sensing range of 35°C - 41°C each modulator consumes a maximum of only 3 to 5×10^{-6} watts of power. Further, each modulator has been stabilized so as to introduce acceptable minimal reading errors for temperature differentials (between the remote sensor and the circuitry) of $\pm 2^{\circ}\text{C}$. All modulators have approximately identical response slopes of approximately 55 cts/ $^{\circ}\text{C}$ or a least-count of approximately $.018^{\circ}\text{C}$. Long-term stability runs have not yet been made.

We have completed all layouts for the Mark V/2(T,T) and Mark V/3(T,T,T) telemeters. The former is a two-channel temperature unit and the latter a three-channel unit.

Construction has initiated on the two-channel unit. This has been accomplished by the use of a precision X10 full size layout photographically reduced to the actual 19mm size. The final, stable film print is used as a template in the fabrication. It is our hope that subsequent units will be fabricated in molded chasses to preclude the precision machine work necessary at the outset. This will also eventually reduce replication costs.

PLANS FOR THE NEXT QUARTER

1. Complete Mark V/2(T,T) unit.
2. Run unit tests on both channels.
3. Record transmitted data.
4. If time permits, make master mold for chassis replication.
5. If time permits, start fabrication of Mark V/3(T,T,T).

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